



Influence of selected heavy metals on Nitrogen mineralization and nitrification of agricultural soils

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As heavy metals can persist in the soil for tens of thousands of years, the long-term effect of these elements on soil productivity is a matter of intensively discussed. Soil microbial functions such as respiration, carbon and nitrogen mineralization, biological nitrogen fixation etc., can thus be used for monitoring heavy metal pollution. This experiment was conducted to evaluate the effect of heavy metals on nitrogen mineralization and nitrification of agricultural soils. Soil in farm field at faculty of Agriculture, amended with 10 $\mu\text{mol/g}$ of Cd, Cr, Zn and Pb separately. Soil without contaminated by heavy metals served as the control treatments. Nitrogen mineralization and nitrification were determined at 3, 7, 14, 21, 28, 42 and 56 days after incubation using Completely Randomized Design (CRD) with four replicates. The results showed that heavy metals subject to depressed both N mineralization and nitrification. At the beginning, N mineralization of the Cd, Cr, Pb, Zn and control was 11.21, 14.98, 16.12, 15.87 and 29.87 mg/Kg of soils. Then at the end of the incubation period N mineralization of the above treated samples deducted up to 2.36, 3.12, 6.15, 5.77 and 9.32 mg/Kg of soils respectively. The cumulative N mineralization of Cd, Cr, Pb and Zn were 49.86, 59.93, 73.16, 71.66 and control was 111.5 mg/Kg of soils at the completion of the testing period. The nitrification of the Cd, Cr, Pb, Zn and control was 19.90, 24.79, 30.11, 27.38 and 32.39 mg/Kg of soils at three days after incubation and at the completion of the incubation values got as 1.20, 2.18, 2.54, 2.19 mg/Kg of soils for above respected treatments. The cumulative nitrification was recorded as 86.84, 100.83, 114.02, 120.15 and 134.44 mg/Kg of soils of Cd, Cr, Pb, Zn and control, respectively. Among the tested heavy metals Cd marked the highly significant effect and Pb got the least significant on both N mineralization and nitrification ($P < 0.05$). According to the data it could be concluded, the heavy metals that make adverse effect on nitrogen mineralization in soil and it depends on the type and toxicity of definite metal in the soil.

Keywords: heavy metals, Nitrogen mineralization, incubation period, toxicity